# ES-M50E/XM-E50

# SERVICE MANUAL

*ES-M50E:*

*US Model*
*Canadian Model*

*XM-E50:*

*US Model*
*Canadian Model*
*AEP Model*
*E Model*

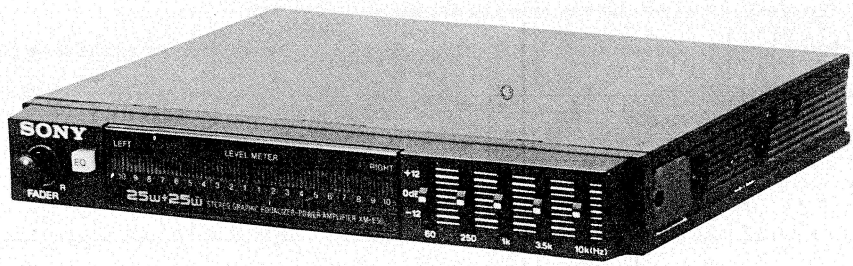



Photo : XM-E50

## SPECIFICATIONS

### AUDIO POWER SPECIFICATIONS

POWER OUTPUT AND TOTAL HARMONIC DISTORTION

12 watts per channel minimum continuous average power into 4 ohms, both channels driven from 40–20,000 Hz with no more than 1.0% total harmonic distortion.

### OTHER SPECIFICATIONS

Circuit system BTL system

Inputs

(ES-M50E)..... Booster inputs (sure seal connectors).....2
Remote control input.....1
Power input (red).....1

(XM-E50) ..... Auxiliary inputs (phono jacks).....2
Remote control input (sure seal connector).....1
Power input (red) (sure seal connector).....1

Outputs Speaker outputs.....4

Speaker impedance
3.2–8 ohms

Maximum power output
25 watts per channel at 4 ohms*

Frequency response
30–20,000 Hz $^{+0}_{-3}$ dB (4 ohms, 1 W)*

Center frequencies of the graphic equalizer
60 Hz, 250 Hz, 1 kHz, 3.5 kHz, 10 kHz

Boost/cut range
+12 dB/–12 dB (±2 dB)

Sensitivity

(ES-M50E)..... Booster inputs 900 mV (4 ohms, 1 W)

(XM-E50).....STD 75 mV, LOW 300 mV (4 ohms, 1 W)

Power requirements
12 V dc car battery (negative ground)

Current drain 5.5 A (at maximum output)*

Mounting dimensions
Approx. 178 × 25 × 132 mm (w/h/d)
($7\frac{1}{8}$ × 1 × 6 inches)

Weight Approx. 1 kg (2 lb 4 oz)

* Measured at 14.4V without choke coil.

ES-M50E:
## STEREO GRAPHIC EQUALIZER-BOOSTER

XM-E50:
## STEREO GRAPHIC EQUALIZER-POWER AMPLIFIER

MICROFILM

SONY®

AUD

# SECTION 1
# DISASSEMBLY

**Note:** Follow the disassembly procedure in the numerical order given.
⇒mark means screw's location when removing the top cover, chassis, printed circuit board, etc.

### 1-1. UPPER CASE/BOTTOM CASE

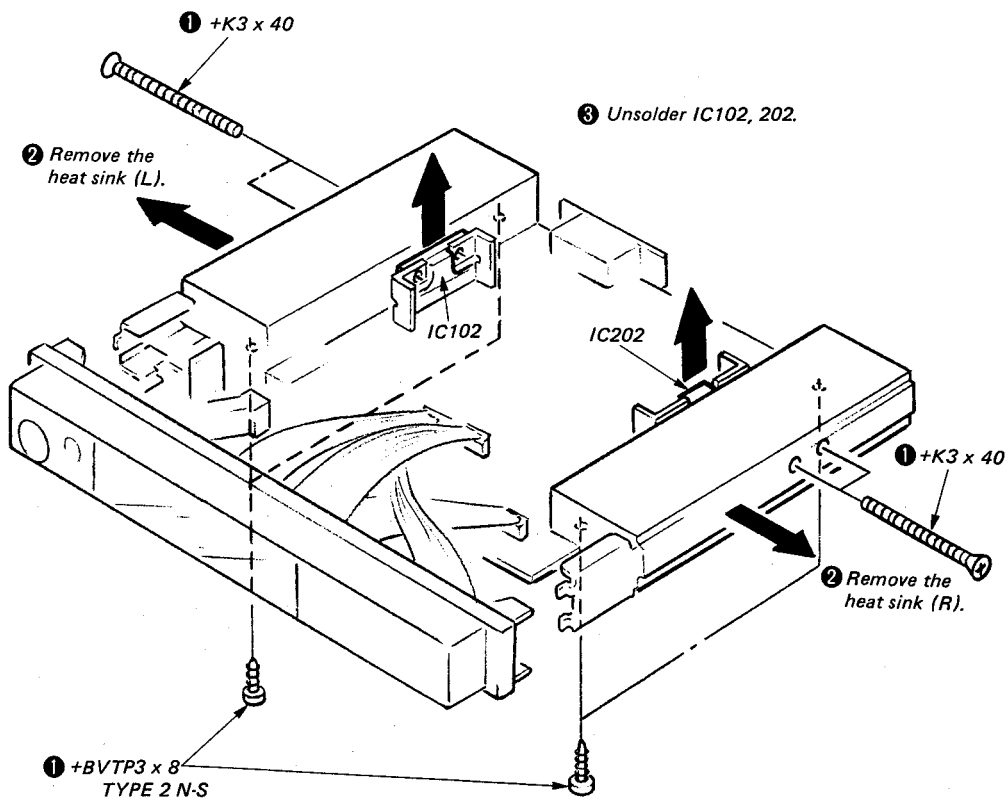
Remove five ⇒ mark screws on the rear side and the hook of each case.

(Each forehead of the upper case and the bottom case has a hook that is attached to the nose piece.)

### 1-2. NOSE PIECE

Remove four screws (+K2.6 x 4) and the nose piece comes off in front.

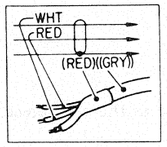
### 1-3. IC102, 202 REMOVAL



## 2-1. MOUNTING DIAGRAM — *Conductor Side* —

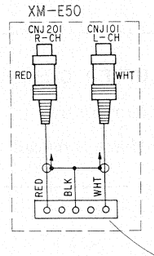
**Note:**

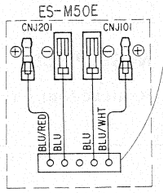
- Color code of sleeving over the end of the jacket.

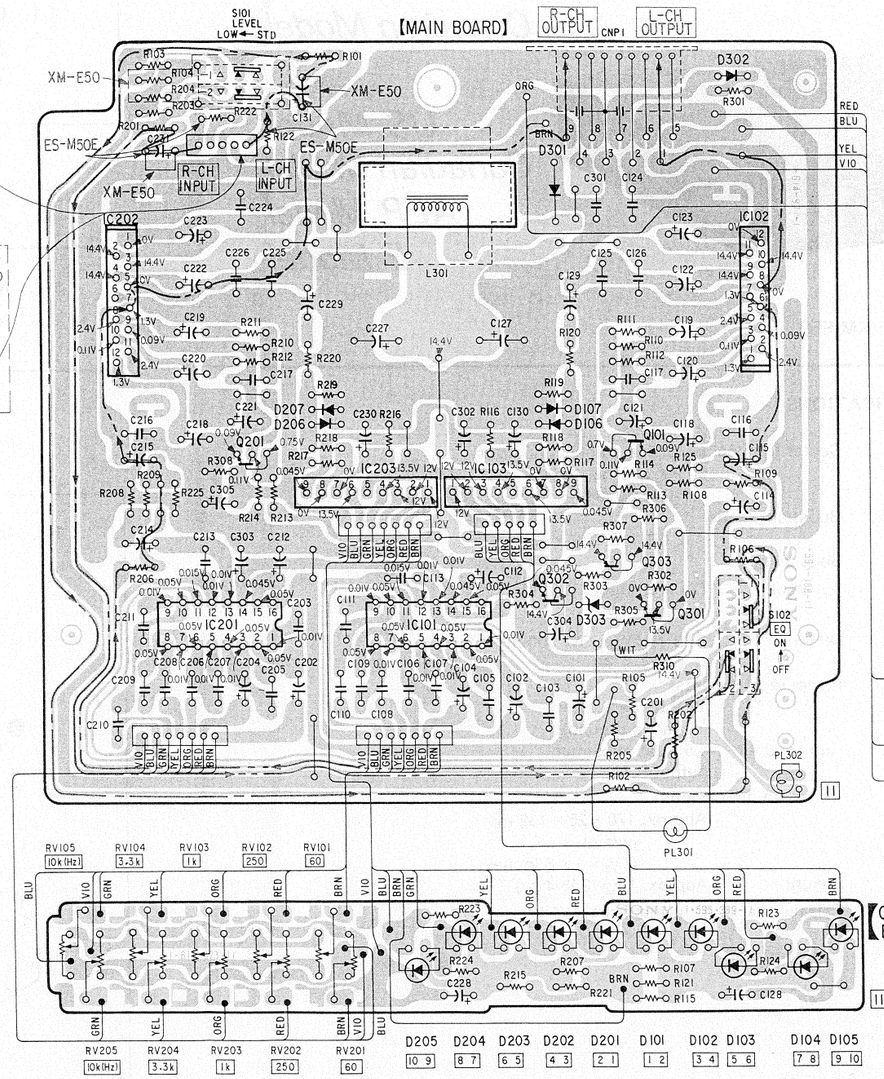



- ○—— : parts extracted from the component side.
- ●—— : parts extracted from the conductor side.
- : signal path
- : L-CH signal path
- : R-CH signal path
- : B + pattern

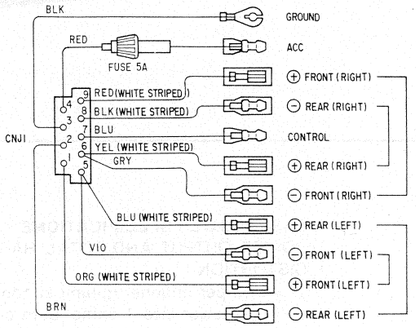
| | ES-M50E | XM-E50 |
|---|---|---|
| C131,C231,R122 R222 | mounted | not mounted |
| S101,R104,R204 | not mounted | mounted |



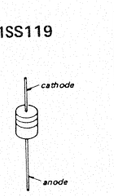




| Q, IC | D |
|---|---|
| | 302 |
| | 301 |
| IC202 IC101 | |
| | 207 107 206 106 |
| 201 IC203 IC103 | |
| 303 302 301 IC201 IC101 | 303 |
| | 204 101 203 102 202 105 201 205 103 104 |
| Q, IC | D |

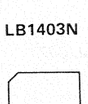



- Semiconductor Lead Layouts

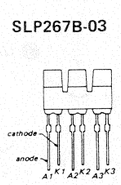
**1SS119**



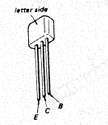

**LB1403N**



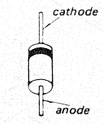

**SLP267B-03**



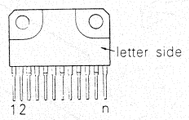

**2SA1175**
**2SC2785**
**2SD1020**



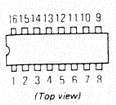

**RD9.1E-B1**



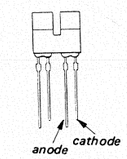

**TA7270P**
**TA7271P**



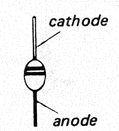

**LA3600**




**SLP167B-02**




**U05G**

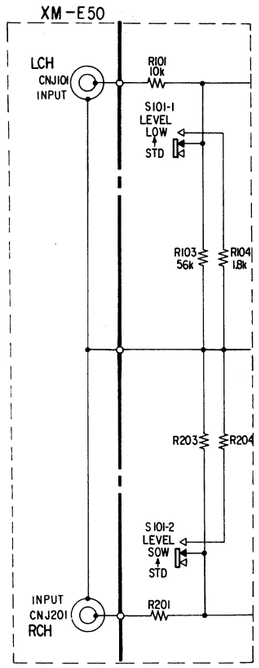


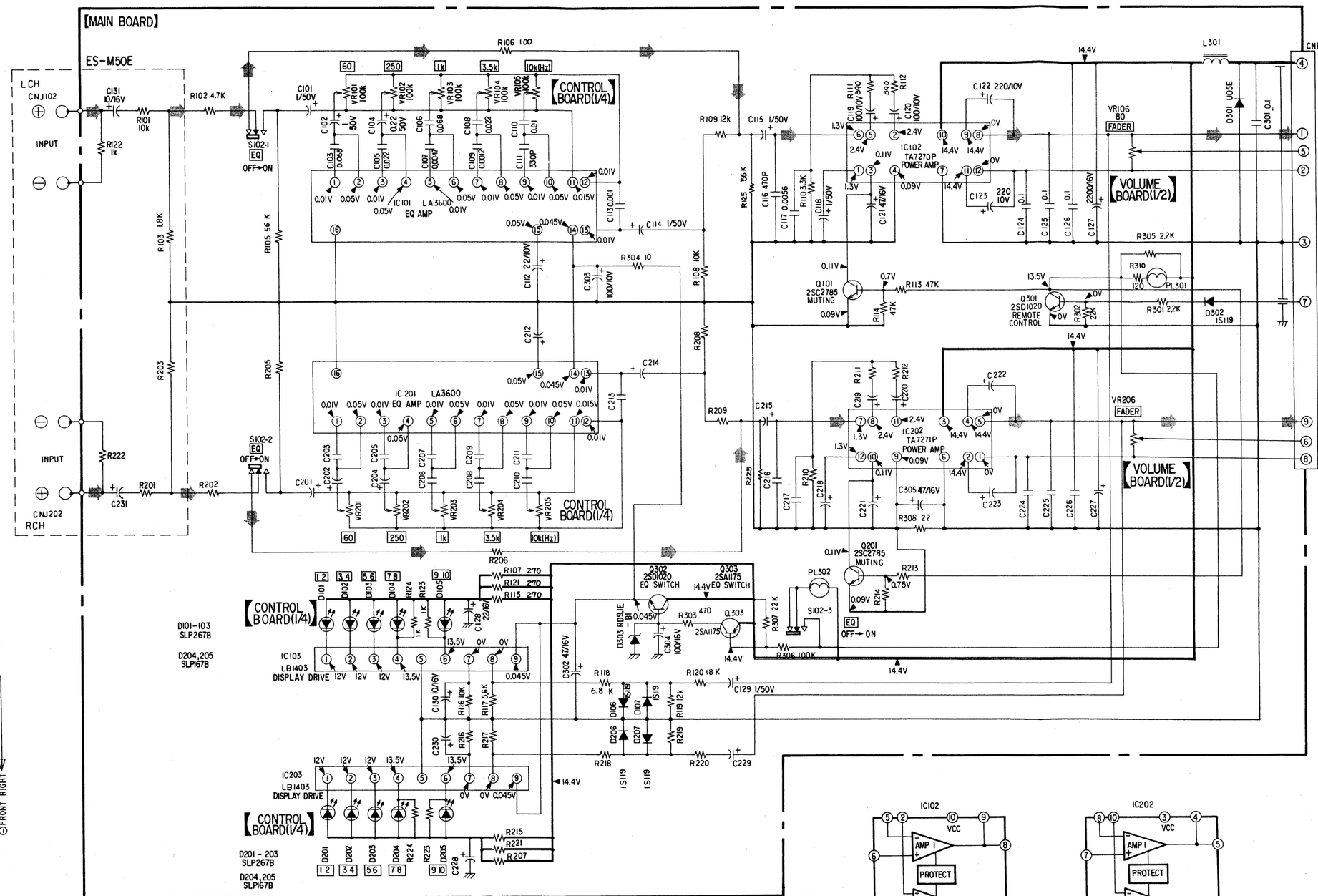

**Note on schematic diagram**

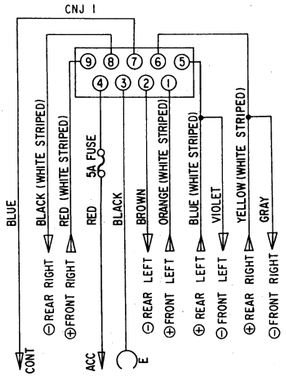
- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- : signal path.
- Components for right channel have same values as for left channel. Reference numbers are coded from 201.
- : B+ bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (50kΩ/V).

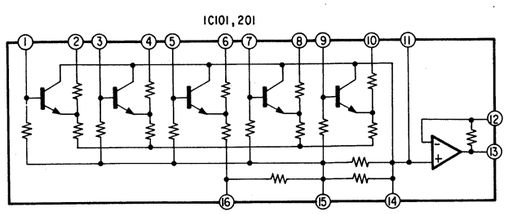
## 2-2. SCHEMATIC DIAGRAM

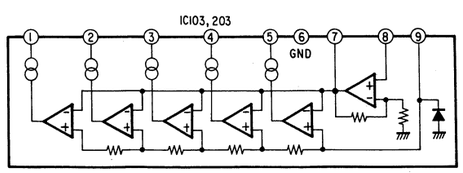
(Refer to page 4 for notes.)

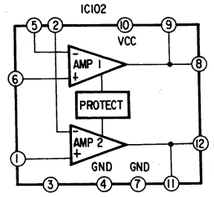


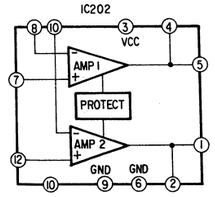



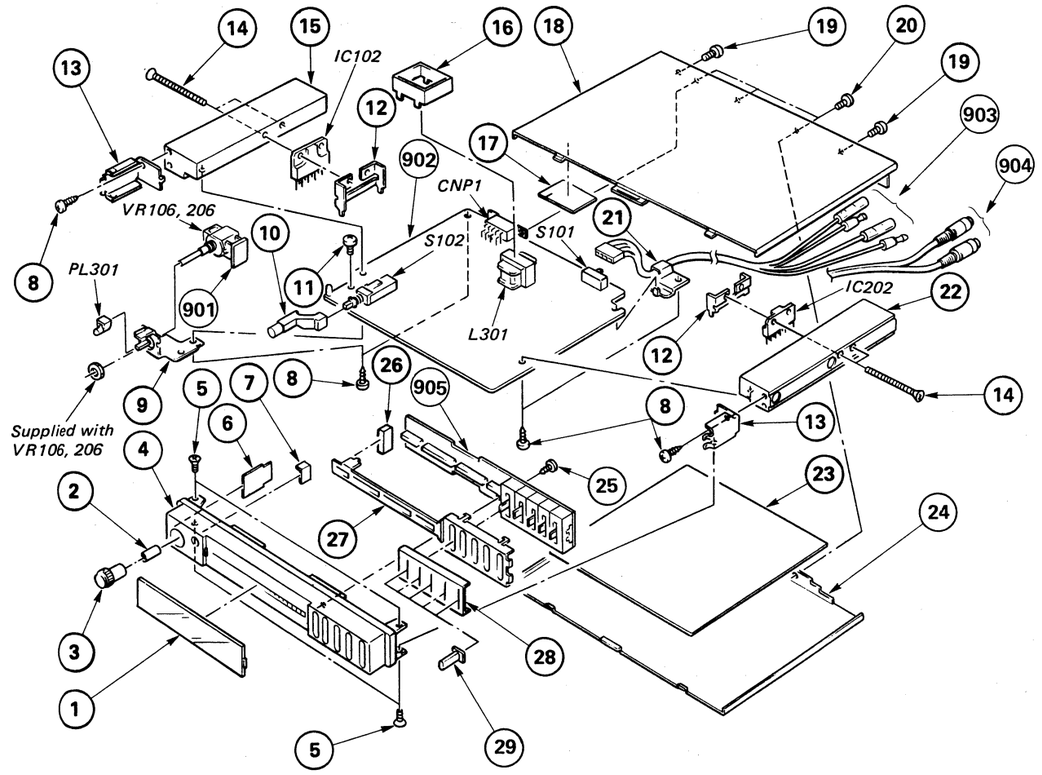



# SECTION 3
# EXPLODED VIEW AND PARTS LIST

NOTE:
- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The construction parts of an assembled part are indicated with a collation number on the remark column.




| No. | Part No. | Description | REMARKS |
|---|---|---|---|
| 1 | 3-303-055-01 | (XM-E50)....PLATE, TRANSPARENT | |
| | 3-303-070-01 | (ES-M50E)...PLATE, TRANSPARENT | |
| 2 | *3-579-613-00 | SPRING | |
| 3 | 3-303-054-01 | (XM-E50)....KNOB, FADER | |
| | 3-303-054-11 | (ES-M50E)...KNOB, FADER | |
| 4 | X-3303-002-1 | (XM-E50)....NOSE PIECE ASSY | |
| | X-3303-003-1 | (ES-M50E)...NOSE PIECE ASSY | |
| 5 | 7-621-559-20 | SCREW +K 2.6X4 | |
| 6 | 3-303-077-01 | COVER (A), LIGHT | |
| 7 | *3-303-075-01 | HEAT SINK | |
| 8 | 7-685-646-14 | SCREW +BVTP 3X8 TYPE2 N-S | |
| 9 | *3-303-060-01 | BRACKET, CONTROL | |
| 10 | 3-303-052-01 | (XM-E50)....BUTTON, DEFEAT | |
| | 3-303-072-01 | (ES-M50E)...BUTTON, DEFEAT | |
| 11 | 7-682-545-04 | SCREW +B 3X4 | |
| 12 | *3-303-063-01 | STOPPER, IC, POWER | |
| 13 | *3-303-065-01 | BRACKET, NOSE PIECE | |
| 14 | 7-682-257-09 | SCREW +K 3X40 | |
| 15 | *3-303-061-01 | HEAT SINK (LEFT) | |
| 16 | *3-303-066-01 | PLATE, SHIELD | |
| 17 | 3-303-076-01 | COVER (B), LIGHT | |

| No. | Part No. | Description | REMARKS |
|---|---|---|---|
| 18 | *3-303-068-01 | (XM-E50)....CASE, BOTTOM | |
| | *3-303-068-11 | (ES-M50E)...CASE, BOTTOM | |
| 19 | 7-685-646-79 | SCREW +BVTP 3X8 TYPE2 N-S | |
| 20 | 7-682-545-09 | SCREW +B 3X4 | |
| 21 | *3-303-064-01 | STOPPER, CORD | |
| 22 | *3-303-062-01 | HEAT SINK (RIGHT) | |
| 23 | *3-303-053-01 | INSULATOR | |
| 24 | *3-303-067-01 | CASE, UPPER | |
| 25 | 7-685-134-14 | SCREW +P 2.6X8 TYPE2 NON-SLIT | |
| 26 | 9-911-815-02 | CUSHION | |
| 27 | *3-303-058-01 | GUIDE | |
| 28 | *3-303-059-01 | COVER, CONTROL, SLIDE | |
| 29 | 3-303-057-01 | (XM-E50)....KNOB, EQUALIZER | |
| | 3-303-071-01 | (ES-M50E)...KNOB, EQUALIZER | |
| 901 | *1-614-972-11 | PC BOARD, FADER VOLUME | |
| 902 | *A-3260-271-A | (XM-E50)....MOUNTED PCB, MAIN | |
| | *A-3260-272-A | (ES-M50E)...MOUNTED PCB, MAIN | |
| 903 | 1-557-844-11 | (ES-M50E)...CORD (WITH CONNECTOR) | |
| 904 | 1-557-845-11 | (XM-E50)....CORD (WITH CONNECTOR) | |
| 905 | *1-614-973-11 | PC BOARD, VOLUME | |



NOTE:
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

## ELECTRICAL PARTS

| Ref.No. | Part No. | Description | | | |
|---|---|---|---|---|---|
| 901 | *1-614-972-11 | PC BOARD, FADER VOLUME | | | |
| 902 | *A-3260-271-A | (XM-E50)....MOUNTED PCB, MAIN | | | |
| | *A-3260-272-A | (ES-M50E)...MOUNTED PCB, MAIN | | | |
| 903 | 1-557-844-11 | (ES-M50E)...CORD (WITH CONNECTOR) | | | |
| 904 | 1-557-845-11 | (XM-E50)....CORD (WITH CONNECTOR) | | | |
| 905 | *1-614-973-11 | PC BOARD, VOLUME | | | |
| C101 | 1-123-611-00 | ELECT | 1MF | 20% | 50V |
| C102 | 1-123-611-00 | ELECT | 1MF | 20% | 50V |
| C103 | 1-130-493-00 | MYLAR | 0.068MF | 5% | 50V |
| C104 | 1-123-608-00 | ELECT | 0.22MF | 20% | 50V |
| C105 | 1-130-487-00 | MYLAR | 0.022MF | 5% | 50V |
| C106 | 1-130-493-00 | MYLAR | 0.068MF | 5% | 50V |
| C107 | 1-130-479-00 | MYLAR | 0.0047MF | 5% | 50V |
| C108 | 1-130-487-00 | MYLAR | 0.022MF | 5% | 50V |
| C109 | 1-130-472-00 | MYLAR | 0.0012MF | 5% | 50V |
| C110 | 1-130-483-00 | MYLAR | 0.01MF | 5% | 50V |
| C111 | 1-102-820-00 | CERAMIC | 330PF | 5% | 50V |
| C112 | 1-123-644-00 | ELECT | 22MF | 20% | 10V |
| C113 | 1-130-471-00 | MYLAR | 0.001MF | 5% | 50V |
| C114 | 1-123-611-00 | ELECT | 1MF | 20% | 50V |
| C115 | 1-123-611-00 | ELECT | 1MF | 20% | 50V |
| C116 | 1-130-467-00 | MYLAR | 470PF | 5% | 50V |
| C117 | 1-130-480-00 | MYLAR | 0.0056MF | 5% | 50V |
| C118 | 1-123-611-00 | ELECT | 1MF | 20% | 50V |
| C119 | 1-123-307-00 | ELECT | 100MF | 20% | 10V |
| C120 | 1-123-307-00 | ELECT | 100MF | 20% | 10V |
| C121 | 1-123-821-00 | ELECT | 47MF | 20% | 16V |
| C122 | 1-123-308-00 | ELECT | 220MF | 20% | 10V |
| C123 | 1-123-308-00 | ELECT | 220MF | 20% | 10V |
| C124 | 1-130-495-00 | MYLAR | 0.1MF | 5% | 50V |
| C125 | 1-130-495-00 | MYLAR | 0.1MF | 5% | 50V |
| C126 | 1-130-495-00 | MYLAR | 0.1MF | 5% | 50V |
| C127 | 1-123-566-00 | ELECT | 2200MF | 20% | 16V |
| C128 | 1-124-234-00 | ELECT | 22MF | 20% | 16V |
| C129 | 1-123-611-00 | ELECT | 1MF | 20% | 50V |
| C130 | 1-123-617-00 | ELECT | 10MF | 20% | 16V |
| C131 | 1-123-617-00 | (ES-M50E)...ELECT | 10MF | 20% | 16V |
| C301 | 1-130-495-00 | MYLAR | 0.1MF | 5% | 50V |
| C302 | 1-123-821-00 | ELECT | 47MF | 20% | 16V |
| C303 | 1-123-307-00 | ELECT | 100MF | 20% | 10V |
| C304 | 1-123-333-00 | ELECT | 100MF | 20% | 16V |
| C305 | 1-123-821-00 | ELECT | 47MF | 20% | 16V |
| CNJ1 | 1-557-868-11 | CORD (WITH CONNECTOR) | | | |
| CNP1 | 1-564-841-11 | CONNECTOR | | | |
| CNP101 | *1-560-591-00 | PIN, CONNECTOR 7P | | | |
| CNP102 | *1-560-591-00 | PIN, CONNECTOR 7P | | | |

## ELECTRICAL PARTS

| Ref.No. | Part No. | Description | | | |
|---|---|---|---|---|---|
| CNP103 | *1-560-591-00 | PIN, CONNECTOR 7P | | | |
| CNP104 | *1-560-468-00 | PIN, CONNECTOR 5P | | | |
| D101 | 8-719-920-18 | DIODE SLP267B-03 | | | |
| D102 | 8-719-920-18 | DIODE SLP267B-03 | | | |
| D103 | 8-719-920-18 | DIODE SLP267B-03 | | | |
| D104 | 8-719-920-17 | DIODE SLP167B-02 | | | |
| D105 | 8-719-920-17 | DIODE SLP167B-02 | | | |
| D106 | 8-719-911-19 | DIODE 1SS119 | | | |
| D107 | 8-719-911-19 | DIODE 1SS119 | | | |
| D201 | 8-719-920-18 | DIODE SLP267B-03 | | | |
| D202 | 8-719-920-18 | DIODE SLP267B-03 | | | |
| D203 | 8-719-920-18 | DIODE SLP267B-03 | | | |
| D204 | 8-719-920-17 | DIODE SLP167B-02 | | | |
| D205 | 8-719-920-17 | DIODE SLP167B-02 | | | |
| D206 | 8-719-911-19 | DIODE 1SS119 | | | |
| D207 | 8-719-911-19 | DIODE 1SS119 | | | |
| D301 | 8-719-911-55 | DIODE U05G | | | |
| D302 | 8-719-911-19 | DIODE 1SS119 | | | |
| D303 | 8-719-100-50 | DIODE RD9.1EB1 | | | |
| IC101 | 8-759-801-23 | IC LA3600 | | | |
| IC102 | 8-759-204-34 | IC TA7270P | | | |
| IC103 | 8-759-801-04 | IC LB1403N | | | |
| IC201 | 8-759-801-23 | IC LA3600 | | | |
| IC202 | 8-759-204-35 | IC TA7271P | | | |
| IC203 | 8-759-801-04 | IC LB1403N | | | |
| L301 | 1-421-369-00 | COIL, CHOKE | | | |
| PL301 | 1-518-572-11 | LAMP, PILOT | | | |
| PL302 | 1-518-573-11 | LAMP, PILOT | | | |
| Q101 | 8-729-178-54 | TRANSISTOR 2SC2785 | | | |
| Q201 | 8-729-178-54 | TRANSISTOR 2SC2785 | | | |
| Q301 | 8-729-102-03 | TRANSISTOR 2SD1020 | | | |
| Q302 | 8-729-102-03 | TRANSISTOR 2SD1020 | | | |
| Q303 | 8-729-117-54 | TRANSISTOR 2SA1175 | | | |
| R101 | 1-247-855-00 | CARBON | 10K | 5% | 1/6W |
| R102 | 1-247-847-00 | CARBON | 4.7K | 5% | 1/6W |
| R103 | 1-247-873-00 | (XM-E50)....CARBON | 56K | 5% | 1/6W |
| R103 | 1-247-837-00 | (ES-M50E)...CARBON | 1.8K | 5% | 1/6W |
| R104 | 1-247-837-00 | (XM-E50)...CARBON | 1.8K | 5% | 1/6W |
| R105 | 1-247-873-00 | CARBON | 56K | 5% | 1/6W |
| R106 | 1-247-807-00 | CARBON | 100 | 5% | 1/6W |
| R107 | 1-247-817-00 | CARBON | 270 | 5% | 1/6W |
| R108 | 1-247-855-00 | CARBON | 10K | 5% | 1/6W |
| R109 | 1-247-857-00 | CARBON | 12K | 5% | 1/6W |

## ELECTRICAL PARTS

| Ref.No. | Part No. | Description | | | |
|---|---|---|---|---|---|
| R110 | 1-247-843-00 | CARBON | 3.3K | 5% | 1/6W |
| R111 | 1-247-821-00 | CARBON | 390 | 5% | 1/6W |
| R112 | 1-247-821-00 | CARBON | 390 | 5% | 1/6W |
| R113 | 1-247-871-00 | CARBON | 47K | 5% | 1/6W |
| R114 | 1-247-871-00 | CARBON | 47K | 5% | 1/6W |
| R115 | 1-247-817-00 | CARBON | 270 | 5% | 1/6W |
| R116 | 1-247-855-00 | CARBON | 10K | 5% | 1/6W |
| R117 | 1-247-849-00 | CARBON | 5.6K | 5% | 1/6W |
| R118 | 1-247-851-00 | CARBON | 6.8K | 5% | 1/6W |
| R119 | 1-247-857-00 | CARBON | 12K | 5% | 1/6W |
| R120 | 1-247-861-00 | CARBON | 18K | 5% | 1/6W |
| R121 | 1-247-817-00 | CARBON | 270 | 5% | 1/6W |
| R122 | 1-247-831-00 | (ES-M50E)...CARBON | 1K | 5% | 1/6W |
| R123 | 1-247-831-00 | CARBON | 1K | 5% | 1/6W |
| R124 | 1-247-831-00 | CARBON | 1K | 5% | 1/6W |
| R125 | 1-247-873-00 | CARBON | 56K | 5% | 1/6W |
| R301 | 1-247-839-00 | CARBON | 2.2K | 5% | 1/6W |
| R302 | 1-247-863-00 | CARBON | 22K | 5% | 1/6W |
| R303 | 1-247-823-00 | CARBON | 470 | 5% | 1/6W |
| R304 | 1-247-783-00 | CARBON | 10 | 5% | 1/6W |
| R305 | 1-247-839-00 | CARBON | 2.2K | 5% | 1/6W |
| R306 | 1-247-879-00 | CARBON | 100K | 5% | 1/6W |
| R307 | 1-247-863-00 | CARBON | 22K | 5% | 1/6W |
| R308 | 1-247-091-00 | CARBON | 22 | 5% | 1/4W |
| R310 | 1-247-109-00 | CARBON | 120 | 5% | 1/4W |
| VR101 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 60Hz) | | | |
| VR102 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 250Hz) | | | |
| VR103 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 1kHz) | | | |
| VR104 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 3.5kHz) | | | |
| VR105 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 10kHz) | | | |
| VR106 | 1-230-714-11 | ERS, VAR, METAL GLAZE 80/80 (FADER) | | | |
| VR201 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 60Hz) | | | |
| VR202 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 250Hz) | | | |
| VR203 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 1kHz) | | | |
| VR204 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 3.5kHz) | | | |
| VR205 | 1-230-715-11 | ERS, VAR, SLIDE 100/100K (G.EQ 10kHz) | | | |
| VR206 | 1-230-714-11 | ERS, VAR, METAL GLAZE 80/80 (FADER) | | | |
| S101 | 1-553-937-00 | (XM-E50)....SWITCH, SLIDE (LEVEL) | | | |
| S102 | 1-570-165-11 | SWITCH, PUSH (1 KEY)(EQ) | | | |

## ACCESSORY & PACKING MATERIAL

| No. | Part No. | Description |
|---|---|---|
| 71 | 1-532-421-00 | FUSE |
| 72 | 1-557-953-11 | (ES-M50E)....CORD (WITH CONNECTOR) |
| 73 | 1-557-953-21 | (ES-M50E)....CORD (WITH CONNECTOR) |
| 74 | 3-302-708-00 | (XM-E50:US/ES-M50E:US)...COVER, CONNECTOR |
| 75 | *3-303-074-01 | (XM-E50:Canadian)...LABEL, SWITCH |
| 76 | 3-303-079-01 | (XM-E50)....INDIVIDUAL CARTON |
| | 3-303-083-01 | (ES-M50E)...INDIVIDUAL CARTON |
| 77 | 3-303-080-01 | CUSHION (G) |
| 78 | 3-307-051-01 | (XM-E50:US)...CARD BOARD (A) |
| 79 | 3-701-613-00 | BAG, POLYETHYLENE |
| 80 | *3-703-591-01 | (XM-E50:AEP)...LABEL (23585S)(SMALL), FTZ |
| 81 | 3-760-261-21 | (ES-M50E:US)...MANUAL, INSTRUCTION |
| | 3-760-262-21 | (XM-E50:US)....MANUAL, INSTRUCTION |
| | 3-760-261-31 | (ES-M50E:Canadian)...MANUAL, INSTRUCTION |
| | 3-760-262-31 | (XM-E50:Canadian,AEP,E) ...MANUAL, INSTRUCTION |
| 82 | X-3315-702-1 | SCREW ASSY (25MM), FITTING |
| 83 | 7-682-261-09 | SCREW +K 4X8 |
| 84 | 1-556-167-00 | (XM-E50)....CORD, CONNECTION |
| 85 | 3-794-669-11 | INSTRUCTION, CAUTION |
| 86 | 2-259-753-00 | BAG, PROTECTION |
| 87 | *3-303-050-01 | (XM-E50)....LABEL, MODEL NUMBER |
| | *3-303-051-01 | (ES-M50E)...LABEL, MODEL NUMBER (PS) |
| 88 | 3-310-655-01 | SUPPORT (ND), FITTING |
| 89 | 3-315-736-11 | BRACKET, NEW D |